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# Urgency of Transparency Regulation and Informed Consent in the Use of AI-Based Medical Chatbots in Indonesia

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**ABSTRACT**

The rapid development of artificial intelligence technology has significantly transformed the healthcare sector, including the emergence of AI-based medical chatbots used for diagnosis support, symptom checking, health consultation, and patient education. In Indonesia, the adoption of medical chatbots has increased alongside the expansion of digital health services. However, the legal framework governing transparency obligations and informed consent mechanisms in the operation of AI-based medical chatbots remains fragmented and insufficient. This study analyzes the urgency of establishing comprehensive regulations concerning transparency and informed consent in the use of medical chatbots in Indonesia. The research employs a normative juridical method through statutory, conceptual, and comparative approaches. The study examines Indonesian laws relating to health services, electronic information systems, personal data protection, consumer protection, and medical ethics. The findings indicate that AI-based medical chatbots may create legal uncertainty regarding accountability, patient autonomy, data privacy, algorithmic bias, and medical malpractice risks when transparency and informed consent principles are not adequately regulated. Furthermore, existing regulations have not specifically addressed the obligations of developers and healthcare providers to disclose AI system limitations, decision-making processes, data usage practices, and potential risks to users. Therefore, Indonesia urgently requires a specific and harmonized regulatory framework to ensure legal certainty, patient protection, ethical healthcare innovation, and responsible AI governance. This article recommends the formulation of detailed transparency standards, mandatory informed consent procedures, algorithmic accountability principles, and supervisory mechanisms to support the safe and ethical implementation of AI-based medical chatbots in Indonesia.



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## 1. INTRODUCTION

Artificial intelligence (AI) has become one of the most influential technological innovations in the modern healthcare system. AI technologies are increasingly utilized in hospitals, telemedicine services, pharmaceutical industries, and public health management [1]. One of the most rapidly developing innovations is the emergence of AI-based medical chatbots. These systems are capable of communicating with users through natural language processing and machine learning techniques to provide health information, symptom analysis, recommendations, and preliminary diagnoses. In Indonesia, the growth of digital health platforms has accelerated significantly after the COVID-19 pandemic, resulting in broader public interaction with AI-assisted healthcare technologies.

Medical chatbots provide several advantages for healthcare systems. They improve accessibility to health information, reduce consultation waiting times, support early symptom screening, and assist healthcare providers in managing administrative and communicative tasks. In a developing country such as Indonesia, where healthcare disparities remain substantial between urban and rural regions, AI-based medical chatbots may contribute to more equitable healthcare access. However, despite these benefits, the implementation of AI-based medical chatbots also introduces various legal, ethical, and social concerns [2].

One of the primary concerns involves the lack of transparency regarding how AI systems process data and generate medical recommendations. Users often do not understand whether the advice provided originates from medical professionals, automated algorithms, or mixed decision-making systems. The absence of transparency may mislead patients and create misconceptions regarding the reliability and authority of the information delivered. In healthcare services, transparency constitutes an essential principle because patients possess the right to understand the nature of medical services and technologies affecting their health decisions.

Another important issue relates to informed consent. Traditionally, informed consent in healthcare requires patients to receive adequate information regarding medical procedures, risks, alternatives, and consequences before consenting to treatment [3]. However, the application of informed consent principles in AI-based medical chatbot systems remains ambiguous. Many digital healthcare platforms merely provide general terms and conditions without ensuring that users genuinely understand how their data are processed, how recommendations are generated, and what risks may arise from relying on chatbot-generated advice [4].

Indonesia currently possesses several laws relevant to digital health governance, including Law Number 17 of 2023 concerning Health, Law Number 27 of 2022 concerning Personal Data Protection, Law Number 11 of 2008 concerning Electronic Information and Transactions as amended, and Law Number 8 of 1999 concerning Consumer Protection [5], [6], [7], [8]. Nevertheless, these regulations do not comprehensively regulate AI-based medical chatbot operations, particularly concerning algorithmic transparency, explainability, informed consent standards, and liability allocation.

The absence of specific regulations creates significant legal uncertainty. Patients may experience harm due to inaccurate recommendations, data breaches, algorithmic discrimination, or misuse of personal health data. At the same time, healthcare providers and technology developers may face unclear accountability standards. Consequently, there is an urgent need to formulate a comprehensive legal framework capable of balancing technological innovation with patient protection and ethical healthcare practices.

This research aims to analyze the urgency of regulating transparency and informed consent in AI-based medical chatbot usage in Indonesia and to formulate legal recommendations for strengthening AI

governance within the national healthcare system.

## 2. LITERATURE REVIEW

Transparency in artificial intelligence refers to the ability of users and regulators to understand how AI systems operate, process data, and generate outputs. Transparency is closely related to the concept of explainability, particularly in high-risk sectors such as healthcare. According to contemporary legal scholarship, transparency is essential to ensure accountability, trust, and fairness in automated decision-making systems. In medical contexts, transparency enables patients to understand the reliability, limitations, and potential risks associated with AI-generated medical recommendations.

Informed consent is a fundamental principle in health law and medical ethics. It is derived from respect for patient autonomy and human dignity. Informed consent requires healthcare providers to disclose relevant information in a comprehensible manner before obtaining patient approval for medical interventions. Traditional informed consent mechanisms involve direct communication between doctors and patients. However, digital healthcare technologies challenge this traditional model because interactions increasingly occur between patients and automated systems.

Scholars have argued that AI systems create a phenomenon known as the "black box problem," where the internal logic of machine learning algorithms becomes difficult to interpret even by developers themselves [9], [10]. In healthcare services, this problem may undermine patient trust and legal accountability. Patients may not understand whether recommendations are generated through evidence-based medical standards or through probabilistic algorithmic models trained on specific datasets.

Several international organizations have emphasized ethical AI governance principles. The World Health Organization highlights transparency, explainability, inclusiveness, accountability, and data privacy as essential principles for AI use in healthcare [11]. Likewise, the European Union Artificial Intelligence Act categorizes AI systems in healthcare as high-risk technologies requiring strict regulatory oversight, transparency obligations, and human supervision [12].

Previous studies have demonstrated that inadequate transparency and informed consent mechanisms may increase the risk of privacy violations, biased healthcare outcomes, misinformation, and discriminatory treatment [13]. Moreover, the commercialization of healthcare data by digital platforms raises concerns regarding exploitation of patient information for economic interests without adequate consent.

Therefore, legal scholars increasingly recommend the establishment of sector-specific AI regulations that integrate human rights protection, data governance standards, ethical medical principles, and accountability frameworks [14]. Indonesia may learn from comparative regulatory approaches adopted in the European Union, Singapore, and other jurisdictions in developing its own AI governance framework for healthcare technologies

## 3. METHODS

This research employs a normative juridical research method. The normative juridical approach focuses on analyzing legal norms, principles, doctrines, and statutory regulations relating to the use of AI-based medical chatbots in Indonesia. The research utilizes three primary approaches: statutory approach, conceptual approach, and comparative approach.

The statutory approach examines Indonesian legislation relevant to digital healthcare governance, including constitutional principles, health laws, electronic information regulations, personal data protection laws, and consumer protection statutes. The conceptual approach analyzes legal theories concerning informed consent, transparency, patient autonomy, accountability, and ethical AI governance. Meanwhile, the comparative approach evaluates international regulatory models

governing AI implementation in healthcare sectors.

The legal materials used in this study consist of primary, secondary, and tertiary legal materials. Primary legal materials include Indonesian statutes and international legal instruments. Secondary legal materials consist of books, academic journals, legal commentaries, and research publications discussing AI ethics, health law, and digital governance. Tertiary legal materials include legal dictionaries and encyclopedias.

Data analysis is conducted qualitatively through legal interpretation and systematic analysis to identify legal gaps, regulatory inconsistencies, and normative solutions concerning transparency and informed consent in AI-based medical chatbot implementation.

## 4. RESULTS AND DISCUSSION

The increasing use of AI-based medical chatbots in Indonesia reflects broader digital transformation within healthcare services. However, the rapid expansion of these technologies has not been accompanied by adequate regulatory readiness. The findings of this research reveal several important legal and ethical concerns requiring immediate policy intervention.

First, the absence of explicit transparency obligations creates substantial information asymmetry between technology providers and users. Most medical chatbot platforms merely provide general disclaimers without explaining how algorithms generate recommendations, what datasets are utilized, and what limitations exist within the system. Consequently, users may incorrectly assume that chatbot outputs possess the same authority and accuracy as professional medical diagnoses.

Transparency is particularly important because healthcare decisions directly affect human life and safety. Patients must understand whether they are interacting with licensed healthcare professionals, AI systems, or hybrid decision-support technologies. Without adequate disclosure, patient autonomy becomes compromised. Furthermore, lack of transparency may hinder accountability determination when harmful outcomes occur.

Second, informed consent mechanisms implemented by digital healthcare platforms remain inadequate. Many platforms rely exclusively on lengthy electronic terms and conditions that users rarely read or understand. Such practices do not fulfill substantive informed consent requirements because valid consent requires clear, specific, understandable, and voluntary information disclosure. In AI-based healthcare services, informed consent should include explanations concerning data collection, algorithmic processing, system limitations, possible inaccuracies, cybersecurity risks, and data-sharing practices.

Third, personal data protection constitutes a major concern. AI-based medical chatbots process highly sensitive health information, including medical histories, symptoms, psychological conditions, and lifestyle data. The misuse or leakage of such information may result in discrimination, reputational harm, financial losses, and violations of privacy rights. Although Indonesia has enacted the Personal Data Protection Law, implementation challenges remain significant due to limited institutional capacity, weak enforcement mechanisms, and lack of sector-specific technical standards.

Fourth, algorithmic bias presents another critical issue. AI systems are trained using datasets that may contain demographic imbalances or historical biases. If datasets inadequately represent Indonesia's diverse population, medical chatbot recommendations may produce inaccurate or discriminatory outcomes for certain communities. This problem is particularly concerning in multicultural societies with varying socioeconomic, linguistic, and healthcare conditions.

Fifth, liability allocation remains legally uncertain. When medical chatbot recommendations cause harm, determining legal responsibility becomes difficult. Liability may involve developers, healthcare institutions, platform providers, physicians,

or users themselves. Existing Indonesian regulations do not clearly define accountability standards for AI-assisted healthcare services. Consequently, victims may face obstacles in obtaining legal remedies and compensation.

From a comparative perspective, the European Union Artificial Intelligence Act offers valuable lessons for Indonesia. The EU categorizes AI healthcare systems as high-risk technologies subject to rigorous transparency, safety, and accountability requirements. Similarly, Singapore has developed AI governance frameworks emphasizing explainability, fairness, and human oversight [15]. Indonesia may adopt contextualized versions of these principles while considering domestic legal culture and institutional capacity.

The urgency of establishing comprehensive regulations is further strengthened by constitutional obligations to protect citizens' health rights and human dignity. Article 28H of the Constitution of the Republic of Indonesia guarantees the right to health services and personal security. Therefore, the state possesses a constitutional responsibility to ensure that digital healthcare technologies operate safely, ethically, and transparently.

To address these challenges, Indonesia should formulate a specific regulatory framework governing AI use in healthcare. Such regulations should include mandatory transparency obligations requiring platforms to disclose AI usage, algorithmic limitations, risk levels, and decision-making structures. Additionally, informed consent procedures should be standardized to ensure meaningful user understanding rather than mere formal acceptance.

Furthermore, supervisory institutions should be established or strengthened to monitor AI healthcare implementation. Independent audits, certification mechanisms, and algorithmic accountability assessments may help ensure compliance with ethical and legal standards. Healthcare professionals should also receive training regarding AI governance, digital ethics, and patient communication responsibilities.

Ultimately, balancing innovation and legal protection is essential. Excessive restrictions may hinder technological development, whereas insufficient regulation may expose society to significant risks. Therefore, Indonesia requires adaptive, principle-based, and human-centered AI governance capable of promoting responsible healthcare innovation while protecting patient rights and public trust.

## 5. CONCLUSION

The use of AI-based medical chatbots in Indonesia offers substantial opportunities for improving healthcare accessibility, efficiency, and digital innovation. Nevertheless, the absence of comprehensive regulations concerning transparency and informed consent creates serious legal, ethical, and social risks. Current Indonesian regulations have not adequately addressed algorithmic explainability, patient understanding, data governance, accountability allocation, and human rights protection within AI-driven healthcare systems.

Transparency and informed consent are essential principles for ensuring patient autonomy, legal certainty, accountability, and ethical healthcare services. Without proper regulation, AI-based medical chatbots may expose users to misinformation, privacy violations, algorithmic bias, and unclear liability structures. Therefore, Indonesia urgently requires a harmonized and sector-specific regulatory framework governing AI healthcare technologies.

The government should establish mandatory transparency standards, meaningful informed consent procedures, algorithmic accountability mechanisms, data protection safeguards, and effective supervisory institutions. In addition, collaboration among policymakers, healthcare professionals, technology developers, academics, and civil society organizations is necessary to develop

responsible and human-centered AI governance.

By implementing comprehensive regulations, Indonesia may maximize the benefits of AI innovation in healthcare while simultaneously protecting patient rights, strengthening public trust, and ensuring ethical digital transformation in the national healthcare system.

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